

Amendment Dated December 3, 2007
Serial No. 10/616,621

REMARKS

Reconsideration of the rejections set forth in the Office Action is respectfully requested. By this amendment, the specification has been amended, claims 6-7, 22-23, and 26 have been canceled without prejudice or disclaimer, and claims 1-5, 8, 12-14, 24-25 and 27 have been amended. Currently, claims 1-5, 8-21, 24-25, and 27 are pending in this application.

Objection to the claims

The Examiner objected to claims 2 and 14 for minor informalities. Applicants have amended the claims to overcome this objection and request that it be withdrawn.

Objection to the specification

The Examiner objected to the specification. Applicants have amended the first paragraph of page 1 as follows (underlined text added, and strikeout text deleted):

This application claims priority to U.S. Provisional Patent Application No. 60/449,641, filed February 24, 2003, and is also ~~is related to an application~~ U.S. Patent Application No. 10/617,011, filed July 10, 2003, entitled METHOD AND APPARATUS FOR PROVIDING ENHANCING RESILIENCY IN VIRTUAL PRIVATE NETWORKS, filed on even date ~~herewith,~~ the content of each of which is hereby incorporated herein by reference.

Rejections under 35 USC 102 and 35 USC 103

Claims 24, 26, and 27 were rejected under 35 USC 103 as anticipated by Balay (U.S. Patent No. 7,116,665). Claims 1-14, 16-20, and 25 were rejected under 35 USC 103 as unpatentable over Balay in view of Shen (U.S. Patent No. 6,907,039). These rejections are respectfully traversed in view of the amendments to the claims and the following arguments.¹

This application relates to a way for exchanging routing information between differently configured VPN sites, so that a VPN site that is using a VR-based VPN model may be interconnected with a VPN site that is using a VRF-based VPN model. (See Specification at page 3, lines 7-10). As described in the background section, there are two commonly used methods of establishing VPN tunnels on a network. (Specification at page 2, lines 8-9). A first

¹ Applicants have reviewed the Office Action and it does not appear that claim 15 was addressed in connection with the rejection under 35 USC 102 or 35 USC 103.

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VPN model is described in IETF RFC 2547, in which VPN routing and forwarding tables (VRFs) are used to store routing information. (Specification at page 2, lines 9-17). A second VPN model is based on the concept of a Virtual Router (VR). (Specification at page 2, lines 18-19). A virtual router is often implemented as software construct in a physical router which has all the attributes of a physical router, but which shares processor time, switch plane resources, and other physical resources of the physical router. (Specification at page 2, lines 19-21).

As noted by applicants at page 2, lines 27-30, both VR-based VPNs and VRF-based VPNs were widely deployed on existing communication networks at the time the application was filed. However, because of differences in the way in which they are constructed, the type of routing information used by the different models, and the manner in which the routing information was distributed in the different models, it was not easy to interconnect a VPN site operating a VRF-based VPN with a VPN site operating a VR based VPN.

Neither Balay, nor Shen, alone or in combination, teaches a way to interconnect a VR based VPN site with a VRF-based VPN site. Balay teaches a system that is entirely RFC 2547 (VRF)-based. Balay describes, in the background, that RFC 2547 requires a single unique Routing Information Base (RIB) and Forwarding Information Base (FIB) for each VPN. (Balay at Col. 2, lines 20-21). Additionally, Balay explains that RFC 2547 requires each VPN communication protocol associated with the VPN to communicate with a single Virtual Routing and Forwarding Module (VRFM). (See Balay at col. 2, lines 21-24). Balay notes, however, that it would be nice to allow a given CE/PE pair to use more than one VPN. (Balay at col. 2, lines 35-41). Thus, Balay sought out to allow a given customer (CE) to implement multiple VPNs, while allowing the PE to implement a common VRF for all the VPNs at the CE.

To do this, Balay proposes to institute a new construct which Balay refers to as VPN Protocol Instance Modules (VRPs). (See Balay at col. 37-40 – explaining VRP, and Balay at Col. 3, lines 51-63, explaining how VRPs fit into a VRF). In Balay, a VPN interface, i.e. the PE-CE link defined in RFC 2547, is associated with a VRF. Multiple VRPs can reside within the VRF and share the same RIB and FIB for the VRF. This allows Balay to provide support for multiple VPNs from a given CE using a single VRF. Since each VRP is able to be associated with a different VPN, and multiple VRPs can live in a single VRF, the customer can implement multiple VPNs while only requiring the VR to implement a single VRF. Thus, Balay teaches

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how to implement multiple VPNs using a single VRF in the 2547 model. Balay does not address how VRF-based VPNs and VR-based VPNs should be connected together.

The Examiner indicated, in the office action, that Balay fails to teach or suggest implementing first and second VPN models in a gateway, but contends that this is taught by Shen.

Shen teaches a way for multiple Virtual Routers to exchange routing information on the same side of a VPN. For example, in connection with Fig. 1, Shen teaches that interior gateway routing tables should include internal destinations with corresponding next hops that will enable data to be forwarded between virtual routers implemented in the same gateway. (Shen at Col. 3, lines 30-46). Shen does not teach or suggest routing between a VR-based VPN and a VRF-based VPN.

Applicants have amended claim 1 to recite a method of exchanging routing information between VPN sites which includes the steps of receiving, by a network device, first routing information, the first routing information being from a VR-based VPN site implemented using a VR-based VPN model, and receiving, by the network device, second routing information from a VRF-based VPN site implemented using a VRF-based VPN model. Claim 1 further recites that the both the first and second routing information are associated with a first VPN, and that the first and second routing information is stored in a common routing table for the first VPN.

The combination of Balay and Shen would not have taught or suggested storing VRF-based VPN information in a common routing table with VR-based VPN information. Accordingly, applicants respectfully submit that claim 1, as amended, is patentable over the combination of Balay and Shen.

Claim 6 previously recited the use of both a VR and VRF VPN models. In connection with this claim, the Examiner stated that the limitations of this claim had been addressed in connection with the explanation of the rejection of claim 1 (See Office Action at page 5). Applicants have reviewed the rejection of claim 1, and it does not appear that the Examiner pointed out where Balay and/or Shen taught the use of both VR and VRF VPN models in a common network device. Additionally, as discussed above, the amendments to the claims also recite that routing information from a VPN implemented using both VR and VRF models is stored in a common routing table. This feature of claim 1 is not taught by Balay and Shen, alone

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or in combination. Accordingly, applicants respectfully submit that claim 1 as amended is patentable over this combination of references.

Claim 14 originally recited a method of interconnecting a VPN tunnel between a VPN site implementing a VR-based VPN and a VPN site implementing a VRF-based VPN. The Examiner addressed claim 14 at page 3, but did not address the limitations of claim 14. Specifically, claim 14 included the steps of collecting routing information from a VR-based VPN and collecting routing information from the VRF-based VPN. The Examiner did not point out where Balay teaches or suggests that one of the VPN sites should be implementing a VR-based VPN. Rather, the Examiner pointed to Fig. 2, which only relates to VRF-based VPNs.

Claim 14 further recited the steps of correlating the routing information from the VR-based VPN and the routing information from the VRF-based VPN, and storing the correlated routing information in a VPN routing information base. Balay similarly does not teach or suggest these steps, since Balay teaches the use of VRF-based VPNs not both VR and VRF-based VPNs. Shen does not make up the deficiencies of Balay, as discussed above. Accordingly, applicants respectfully submit that claim 14, as previously presented, was not obvious over Balay alone or in combination with Balay.

Independent claim 24 has also been amended to distinguish over the combination of Balay and Shen. Accordingly, that claim is also believed patentable over the cited combination.

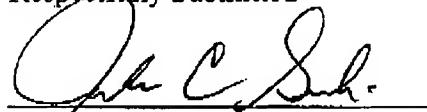
Conclusion

Applicants believe the claims as pending or amended are allowable over the art of record. However, if the Examiner is not of the same opinion, applicants would be very interested in talking with the Examiner to discuss the cited art and the claims to attempt to arrive at claims that the Examiner feels are of appropriate scope in view of the prior art. Accordingly, if the Examiner believes that the claims are unpatentable for any reason, the Examiner is invited to telephone the undersigned at the telephone number listed below to discuss this application. If the Examiner has any questions or concerns regarding the amendments or these remarks, the Examiner is also requested to contact the undersigned.

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If any fees are due in connection with this filing, the Commissioner is hereby authorized to charge payment of the fees associated with this communication or credit any overpayment to Deposit Account No. 502246 (Ref: NN-15942).

Respectfully Submitted



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Dated: December 3, 2007

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